

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : C12N 15/86, 5/10, A61K 48/00	A3	(11) International Publication Number: WO 96/33282 (43) International Publication Date: 24 October 1996 (24.10.96)
(21) International Application Number: PCT/US96/05638 (22) International Filing Date: 19 April 1996 (19.04.96) (30) Priority Data: 08/425,180 20 April 1995 (20.04.95) US (71) Applicant: CHIRON VIAGENE, INC. [US/US]; 4560 Horton Street, Emeryville, CA 94608 (US). (72) Inventor: JOLLY, Douglas, J.; 277 Hillcrest Drive, Leucadia, CA 92024 (US). (74) Agents: KRUSE, Norman, J. et al.; Chiron Corporation, Intellectual Property - R440, P.O. Box 8097, Emeryville, CA 94662-8097 (US).	(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 12 December 1996 (12.12.96)	
(54) Title: HIGH EFFICIENCY EX VIVO TRANSDUCTION OF CELLS BY HIGH TITER RECOMBINANT RETROVIRAL PREPARATIONS		
(57) Abstract Compositions and methods for the efficient <i>ex vivo</i> introduction of nucleic acid into T cells, non-dividing cells, and cells resistant to standard transduction techniques mediated by high titer recombinant retroviral preparations is described. The recombinant vector constructs carried by the recombinant retrovirus particles code for the production of one or more desired gene products from one or more corresponding genes of interest, at least one of the gene products having a therapeutic application. Upon re-introduction into a patient, the transduced cells produce a desired gene product in an amount sufficient to treat a particular disease state.		

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	GB	United Kingdom	MW	Malawi
AT	Austria	GE	Georgia	MX	Mexico
AU	Australia	GN	Guinea	NE	Niger
BB	Barbados	GR	Greece	NL	Netherlands
BE	Belgium	HU	Hungary	NO	Norway
BF	Burkina Faso	IE	Ireland	NZ	New Zealand
BG	Bulgaria	IT	Italy	PL	Poland
BJ	Benin	JP	Japan	PT	Portugal
BR	Brazil	KE	Kenya	RO	Romania
BY	Belarus	KG	Kyrgyzstan	RU	Russian Federation
CA	Canada	KP	Democratic People's Republic of Korea	SD	Sudan
CF	Central African Republic	KR	Republic of Korea	SE	Sweden
CG	Congo	KZ	Kazakhstan	SG	Singapore
CH	Switzerland	LI	Liechtenstein	SI	Slovenia
CI	Côte d'Ivoire	LK	Sri Lanka	SK	Slovakia
CM	Cameroon	LR	Liberia	SN	Senegal
CN	China	LT	Lithuania	SZ	Swaziland
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	LV	Latvia	TG	Togo
DE	Germany	MC	Monaco	TJ	Tajikistan
DK	Denmark	MD	Republic of Moldova	TT	Trinidad and Tobago
EE	Estonia	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	UG	Uganda
FI	Finland	MN	Mongolia	US	United States of America
FR	France	MR	Mauritania	UZ	Uzbekistan
GA	Gabon			VN	Viet Nam

INTERNATIONAL SEARCH REPORT

Intern Application No
PCT/US 96/05638A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 C12N15/86 C12N5/10 A61K48/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 C12N A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO,A,95 07358 (UNIVERSITY OF MEDICINE & DENTISTRY OF NEW JERSEY (US)) 16 March 1995 see the whole document. ---	1-34
X	WO,A,94 29438 (CELL GENESYS, INC. (US)) 22 December 1994 see the claims. ---	1-34
X	WO,A,94 22489 (TARGETED GENETICS CORPORATION (US)) 13 October 1994 see Examples 3-5 and the claims. --- -/--	1-34

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- *&* document member of the same patent family

Date of the actual completion of the international search

7 October 1996

Date of mailing of the international search report

25. 10. 96

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Yeats, S

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 96/05638

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>SCIENCE, vol. 251, 1991, pages 1363-1366, XP000381747 G. FERRARI ET AL.: "An in vivo model of somatic cell gene therapy for human severe combined immunodeficiency" see the whole document. ---</p>	1-34
X	<p>HUMAN GENE THERAPY, vol. 5, 1994, pages 1115-1120, XP002012405 M.C. LEAVITT ET AL.: "Transfer of an anti-HIV-1 ribozyme gene into primary human lymphocytes" see the whole document. ---</p>	1-34
X	<p>PROC. NATL. ACAD. SCI. USA, vol. 92, 1995, pages 1023-1027, XP002012406 V.J. DWARKI ET AL.: "Gene therapy for hemophilia A: production of therapeutic levels of human factor VIII in vivo in mice" see the whole document. ---</p>	1-34
X	<p>THROMBOSIS AND HAEMOSTASIS, vol. 67, 1992, pages 341-345, XP002012407 R.C. HOEBEN ET AL.: "Toward gene therapy in haemophilia A: retrovirus-mediated transfer of a factor VIII gene into murine haemopoietic progenitor cells" see the whole document. -----</p>	1-34

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 96/05638

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
W0-A-9507358	16-03-95	AU-A- 7477394 CA-A- 2168202 EP-A- 0711354	27-03-95 16-03-95 15-05-96
W0-A-9429438	22-12-94	AU-A- 7246294 EP-A- 0710280	03-01-95 08-05-96
W0-A-9422489	13-10-94	AU-A- 6624894 CA-A- 2159898 EP-A- 0693940	24-10-94 13-10-94 31-01-96